

Application No.: 10/658,243

**REMARKS**

The application was initially filed with two claims, namely claims 1 and 2, and claim 2 was withdrawn from further consideration due to election required by the examiner. Currently only claim 1 remains in the application, and is amended to remove objection thereto due to informalities. Marked and clean versions of the claim are attached herewith as appendixes.

***Claim Objections***

Claim 1 is objected to because of informality caused by "the second end" recited in line 8. The term "the second end" is corrected and replaced by "the opposite end". A similar problem occurs in line 10 of the original claim 1 and is also corrected in the same way. The applicant believes the objection to the claim for informalities is now overcome.

***Claim Rejections under 35 U.S.C. 103***

Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over TW 548158B to Apex Bicycle in view of US Patent No. 6,266,990 to Shook et al. Apex discloses a similar method for forming a bicycle crank arm and as noted by the examiner, the Apex method does not include a step of forming an integral spider. However, the Apex method is further different from the method of the subject application. For example, in the method of the subject application, the spider is formed at an earlier step than the channel, but the Apex method requires to form the channel earlier than forming the pedal opening at the pedal end (see English translation of abstract of TW 548158B). This is related to the process that is taken to form the channel. The Apex method uses a plunger to form the channel. On the other hand, since an important aspect of the method of the subject application is to integrally form the spider with the crank, the spider is initially and integrally formed with the

Application No.: 10/658,243

blank. This makes the method of the subject application must employ different way to form the channel, which is in fact formed by drilling as described in the detailed description of the subject application.

In other words, to realize integral formation of the spider with the crank arm, in the method of the subject invention, the spider must be formed initially with the crank blank and this is not necessary and should not be done in the Apex method for the Apex method only focuses on efficiency of manufacturing single crank arm. Due to different goals to be achieved by the method of the subject application and the Apex method, the sequence of certain steps in the Apex methods are either switched or simply missed in the method of the subject application.

Such a difference is technically significant to patentably distinguish the method of the subject application from the Apex method, for they focus on different aspects in forming bicycle cranks and thus take different steps or steps of different sequence.

Further, the examiner is incorrect to assume that a spider is later attached to the "smaller" end in the Apex method. The Spider is actually attached to the larger end that is subject to shrinking to substantially the same diameter of the remaining portion of the blank.

Shook (US Patent No. 6,266,990) discloses forms an integral spider with a crank arm blank. However, due to the different operation sequence of the steps in the Apex method and the Shook method, it is not apparent to any one having ordinary skill to combine the Shook method with the Apex method, simply because the end of the blank of the Apex method where the spider is to be attached has be deformed to seal the opening of the channel before the spider is mounted. This makes the Apex method unable to form integral spider. The examiner's comment: "it would have been obvious to one having

Application No.: 10/658,243

ordinary skill in the art at the time the invention was made to have shaped the billet blank of Apex having a first end on which a spider is integrally formed in light of the teaching of Shook in order to a bicycle crank arm with an integral spider" is simply incorrect at least for the reason stated above.

Further, Apex teaches to fill the channel of the blank with a filler that is solid in room temperature and must be heated before it is released the channel. Shook does not teach filling any material in the channel and it simply forms an empty channel. The filling material used in the method of the subject invention is "liquid". It is impossible for any person having ordinary to combine the teachings of Apex and Shook to provide the method of the subject application. This further distinguishes the method of the subject application from both Apex and Shook.

Thus, the subject application is patentable over the cited references of Apex and Shook or combinations thereof.

Another difference between the subject application and the Apex method resides in the location where an opening of the channel is formed. In the Apex method, the channel is formed in the blank and begins from the end that will be subsequently formed into a joint with sprocket. An expanded end is firstly formed in the Apex method and shrunk by a die to form a closed end, which is later shaped to joint a spider. As mentioned above, the examiner is incorrect to assume that a spider is later attached to the "smaller" end in the Apex method. Due to the requirement for later jointing a spider, the shrinking of the expanded end in the Apex method must be done with precision. This apparently increases the complication of the process. On the other hand, in the method of the subject application forms a channel in the blank beginning from the end that will eventually couple to the pedal arm. This is due to the Apex method uses a plunger to form the channel, which makes it impossible

Application No.: 10/658,243

for the Apex method to form the spider integrally with the blank, as is clearly discussed above.

Further, both Apex and Shook do not teach to form an entry of small diameter that the channel. This facilitates sealing of the channel after the liquid is filled into the channel. Shook does not need such an entry because there is no filling in the channel of Shook blank. Apex does not need such an entry because the filler is solid in the room temperature. It is not possible for any person having ordinary skills to combine the Apex method and the Shook method to obtain the method of the subject application.

Although TW 500679 discloses filling a liquid in the channel of a blank that later forms a bicycle crank. It does not teach forming an entry of reduced diameter. Also, an inner thread must be formed to threadingly engage a lid for seal the filling liquid inside the channel. This is different from the method of the subject application. Further, due to the above mentioned reason, it is not apparent for those having ordinary skills to combine the teaching of TW 500679 with the Shook method and again, the subject application is patentable over the cited references of TW 500679, Apex and Shook or combinations thereof.

In view of the above amendments and remarks, the subject application is believed to be in a condition for allowance and an action to such effect is earnestly solicited.

Respectfully submitted,  
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Application No.: 10/658,243

**(Appendix)-CLEAN VERSION OF THE AMENDED CLAIM**

Claim 1 (Currently Amended): A method for manufacturing a crank arm and spider assembly comprising the following steps:

- (1) providing a blank;
- (2) shaping the blank to form a crank billet comprising an elongate body having a first end on which a spider is integrally formed and an opposite end having an expanded outside diameter;
- (3) forming a channel substantially co-extensive with the elongate body with an opening on the opposite end of the body;
- (4) reducing the expanded second end and thereby reducing inside diameter of the channel in proximity of the opposite end for forming an entry of the channel;
- (5) filling a liquid into the channel through the entry and then sealing the entry;
- (6) placing the crank billet with the liquid filled in the channel into a mold and performing a mold forging operation to obtain a semi-product; and
- (7) forming a hole in the body to release the filling liquid out of the channel of the crank.